The Earth Segment

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- The earth segment of a satellite communications system consists of the transmit and receive earth stations.
- The simplest of these are the home *TV receive-only* (TVRO) systems.
- The most complex are the terminal stations used for international communications networks.
- Earth segment are those stations which are on ships at sea, and commercial and military land and aeronautical mobile stations.
- earth stations that are used for logistic support of satellites, such as providing the telemetry, tracking, and command (TT&C) functions, are considered as part of the space segment

Receive-Only Home TV Systems

- Planned broadcasting directly to home TV receivers takes place in the Ku (12-GHz) band.
- This service is known as *direct broadcast satellite* (DBS) service.
- Originally such downlink signals were never intended for home reception but for network relay to commercial TV outlets (VHF and UHF TV broadcast stations and cable TV “head-end” studios).
- Equipment is now marketed for home reception of C-band signals , and some manufacturers provide dual C-band/Ku-band equipment.

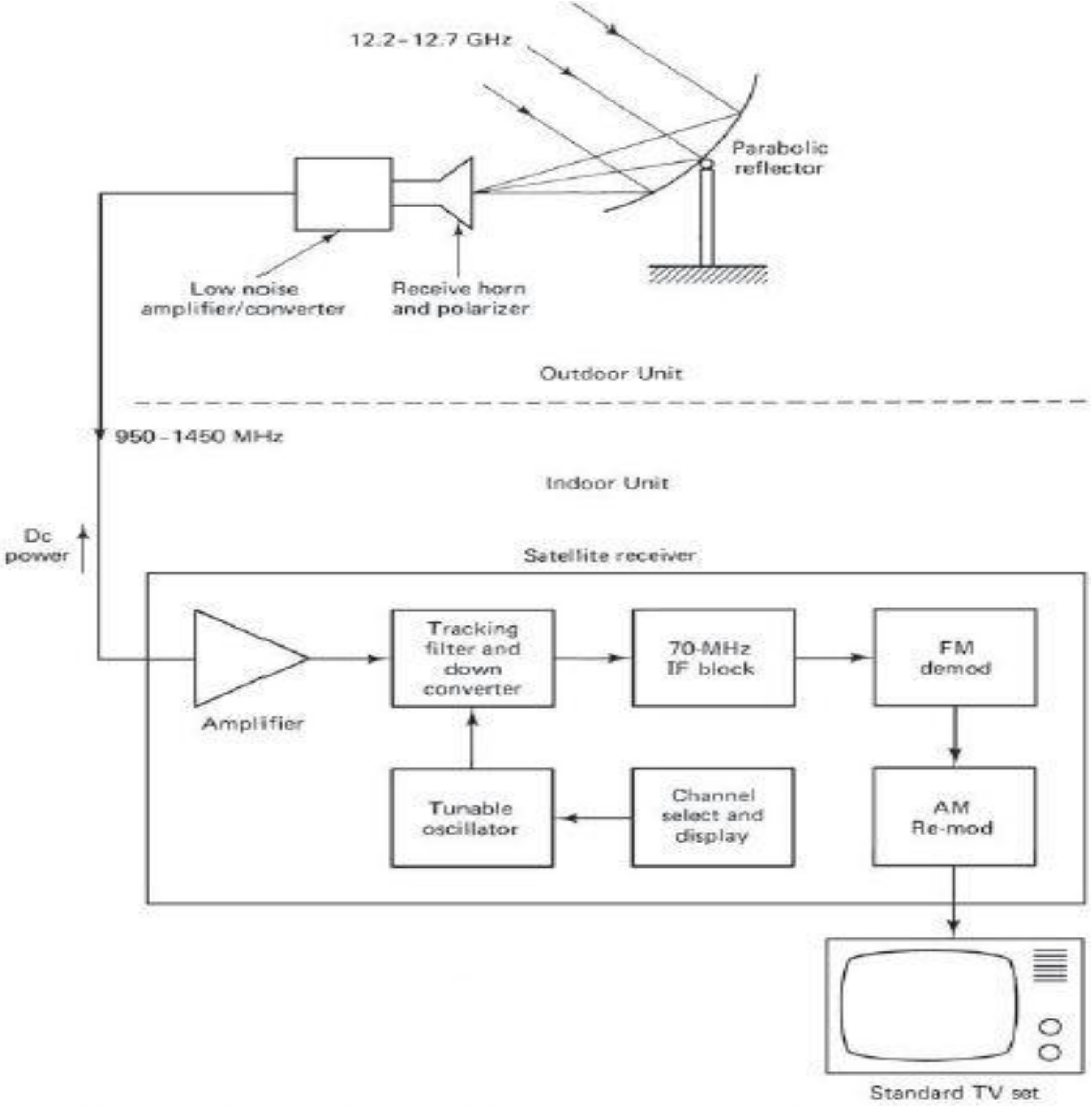

Figure 8.1 Block diagram showing a home terminal for DBS TV/FM reception.

The indoor unit

- The signal fed to the indoor unit is normally a wideband signal covering the range 950 to 1450 MHz. This is amplified and passed to a tracking filter which selects the desired channel.
- The selected channel is again down converted, this time from the 950to 1450-MHz range to a fixed intermediate frequency, usually 70 MHz although other values in the very high frequency (VHF) range are also used.
- The 70-MHz amplifier amplifies the signal up to the levels required for demodulation.
- The 70-MHz, FM intermediate frequency (IF) carrier therefore must be demodulated, and the baseband information used to generate a VSSB signal which is fed into one of the VHF/UHF channels of a standard TV set.
- The demodulated video and audio signals are usually made available at output jacks.

The outdoor unit

- This consists of a receiving antenna feeding directly into a low-noise amplifier/converter combination. A parabolic reflector is generally used, with the receiving horn mounted at the focus.
- The receiving horn feeds into a low-noise converter (LNC) or possibly a combination unit consisting of a low-noise amplifier (LNA) followed by a converter. The combination is referred to as an LNB, for low-noise block.
- The low-noise amplification must be provided at the cable input in order to maintain a satisfactory signal-to-noise ratio. An LNA at the indoor end of the cable would be of little use, because it would also amplify the cable thermal noise.